

Public Service
Electric and Gas
Company

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JAN 09 1997
N96436

United States Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Gentlemen:

REPLY TO NOTICE OF VIOLATION
INSPECTION REPORT NO. 50-354/96-09
HOPE CREEK GENERATING STATION
FACILITY OPERATING LICENSE NPF-57
DOCKET NO. 50-354

Pursuant to the provisions of 10CFR2.201, Public Service Electric and Gas Company (PSE&G) hereby submits a reply to notice of violation (NOV) issued to the Hope Creek Generating Station in a letter dated December 5, 1996. Per discussion between D. Smith of PSE&G and S. Barber of NRC Region I, a submittal date of January 10, 1997 was agreed upon based on late receipt of the violation by PSE&G. The details of the reply are contained in the attachments to this letter.

This letter completes our response to the two Notices of Violation in the December 5, 1996 letter. Our other response was dated December 26, 1996 and discusses Offsite Safety Review department concerns.

Should you have any questions or comment on this transmittal, do not hesitate to contact us.

Sincerely,

E.C. Simpson

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Attachments (2)

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ATTACHMENT 1
EMERGENCY DIESEL GENERATOR/FIRE SUPPRESSION SYSTEM
INTERACTION

INSPECTION REPORT NO. 50-354/96-09
HOPE CREEK GENERATING STATION
DOCKET NO. 50-354

LR-N96436

I. DESCRIPTION OF VIOLATION

The description of the violation contained in the notice of violation received in the December 5, 1996 letter is as follows:

A. Violation B

"10 CFR 50.59 requires, in part, that licensees maintain records of changes to the facility as described in the final safety analysis report (FSAR). These records must include a written safety evaluation which provides the bases for the determination that the changes do not involve an unreviewed safety question.

Contrary to the above, on October 29, 1996, the NRC determined that PSE&G had conducted a de facto change of the facility as described in the FSAR without a written safety evaluation which provided the bases that the change did not constitute an unreviewed safety question. This is evidenced by the following two examples where the facility design does not meet the FSAR description:

1. Section 8.1.4.14.1.3 of the FSAR states that "Non-Class 1E circuits or equipment may be connected to Class 1E equipment or circuits by the use of approved qualified isolation devices to assure that, in the event of failure of the non-Class 1E equipment, the Class 1E equipment will continue to perform its function."

In the design of the Class 1E emergency diesel generator room ventilation system, PSE&G incorrectly used qualified isolation devices in non-Class 1E circuits and failed to assure that, in the event of a failure of these circuits, the Class 1E ventilation system could continue to perform its function.

2. Sections 1.8.1.53 and 8.1.4.10 of the FSAR requires compliance with IEEE 379-1972 and Sections 5.2 through 5.5 of IEEE 379-1977, respectively. IEEE 379 requires, in part, that single failure analyses of Class 1E systems be preconditioned by the failures that non-

Response to EDG/FSS Interaction Violation

Class 1E systems--which are coupled in some manner to the Class 1E systems--may cause.

In their single failure analysis of the Class 1E emergency diesel generator room ventilation system, PSE&G failed to precondition it by the potential failures of the non-Class 1E fire suppression system with which it is coupled electrically and mechanically, thereby failing to recognize that the ventilation system did not meet the single failure criterion.

This is a Severity Level IV violation (Supplement I)."

II. REPLY TO VIOLATION B

Pursuant to the provisions of 10CFR2.201, PSE&G hereby submits a written reply to the above notice of violation which includes the reason for the violation, the corrective steps that have been taken and the results achieved, the corrective steps that will be taken to avoid further violations, and the date when full compliance will be achieved. This information is provided as follows:

A. PSE&G Position

PSE&G agrees with the violation.

B. Description of Event

Inspection Report 354/96-03 identified a concern relative to the interaction between Hope Creek's Emergency Diesel Generators (EDGs) and the Fire Suppression Systems (FSS). Of specific concern is the effects of a postulated failure of the non-safety related fire suppression system on the ability of the EDGs to perform their function. PSE&G responded to the concern in letter LR-N96296 dated October 4, 1996, stating that "the design of the EDG fire suppression system is adequate and no modifications to the system are necessary." The NRC has reviewed PSE&G's position and issued the above violation describing certain sections of the Hope Creek UFSAR which appear to be inconsistent with Hope Creek's as built configuration.

C. Reason for the Violation**Hope Creek's EDG/Fire Suppression System Interaction Design**

The EDG Fire Suppression System is non-safety related and powered by non-Class 1E, UPS electrical power. The system is seismically installed. The EDG room ventilation system

Response to EDG/FSS Interaction Violation

is safety related and powered by Class 1E electrical power. The systems interact through the qualified 3ZZ relay which is a Class 1E isolation device powered by non-Class 1E, non UPS electrical power. The EDG room recirculation system is designed to recirculate the air in the EDG room. The EDG room recirculation system is interlocked to start with the respective EDG. The EDG Fire Suppression System and the EDG room ventilation system interaction is illustrated in Attachment 2.

Upon initiation of the Fire Suppression System, the non-Class 1E Fire Suppression System ES-1 contact closes, energizing the Class 1E 3ZZ relay. This 3ZZ contact in the EDG room ventilation recirculation fan circuitry trips the safety related EDG room recirculation fan. A signal from the non-Class 1E Fire Suppression System circuitry also provides power to electrothermal links which allow the EDG room ventilation mechanical fire dampers to close. This design assures proper concentration of carbon dioxide remains in the EDG room to suppress the fire. This interface is an approved exception to Standard Review Plan criteria which is described in UFSAR section 9.5.1.6.30. Our letter dated October 4, 1996 describes the details of this exception.

In the event of a loss of voltage condition, when the EDGs are required to perform their function, the system is designed such that the non-Class 1E, non UPS backed 3ZZ relay could not energize and the fans would start to support EDG operation. A valid or invalid trip signal to the fans from the non-Class 1E fire suppression system would drop out due to the 3ZZ relay losing power. As a result, the safety related recirculation fan is assured to operate and the Class 1E circuits are assured to continue to perform their function.

Hope Creek UFSAR section 8.1.4.14.1.3 states that non-Class 1E circuits may be connected to Class 1E circuits by use of approved qualified isolation devices to assure that in the event of failure of non-Class 1E equipment, the Class 1E equipment will continue to perform its function. UFSAR Sections 1.8.1.53 and 8.1.4.10 discuss compliance with IEEE 379-1972 and Sections 5.2 through 5.5 of IEEE 379-1977, respectively. IEEE 379 discusses, in part, that single failure analyses of Class 1E systems be preconditioned by the failures that non-Class 1E systems--which are coupled in some manner to the Class 1E systems-- may cause.

Response to EDG/FSS Interaction Violation

As a result of the investigation of this design initiated by this Notice of Violation, PSE&G has identified a design flaw. In the event of sustained degraded voltage from the non-Class 1E offsite power sources, the EDG is required to start and load to support plant safe shutdown. It can be postulated that if a fault develops in the non-Class 1E Fire Suppression System, the non-Class 1E degraded power can remain available to energize the 3ZZ relay. If not detected, this condition could prevent the fan from starting and thus impact continuous operation of the associated EDG per UFSAR section 9.4.6.2. This situation was reported to the NRC in accordance with 10CFR50.72(b)(1)(ii)(B) on January 3, 1997. A Licensee Event Report, in accordance with 10CFR50.73 will follow within 30 days.

For non-LOP (Loss of Power) conditions (i.e., Loss of Coolant Accident, manual initiation of Core Spray logic, manual initiation of the EDG), the EDGs receive a start signal. As discussed in UFSAR section 15.6.5.2.1.1, the EDGs remain idling unloaded in anticipation of a LOP. If a LOP occurs, the same situations as above may occur. If no LOP occurs, the EDGs will operate potentially without ventilation but no accident mitigation response is required.

Response to Example 1

Section 8.1.4.14.1.3 of the FSAR states that "Non-Class 1E circuits or equipment may be connected to Class 1E equipment or circuits by the use of approved qualified isolation devices to assure that, in the event of failure of the non-Class 1E equipment, the Class 1E equipment will continue to perform its function."

The function of the eight (two per EDG) independent safety related recirculation fans is to recirculate the air in the EDG rooms. The electrical interaction between the EDG room ventilation system and the Fire Suppression System does not meet the requirements of UFSAR Section 8.1.4.14.1.3 under degraded grid voltage conditions in that a fault in the non-Class 1E Fire Suppression System circuitry could prevent the function of the Class 1E EDG room ventilation recirculation fan.

Response to Example 2

Sections 1.8.1.53 and 8.1.4.10 of the UFSAR requires compliance with IEEE 379-1972 and revised Sections 5.2 through 5.5 of IEEE 379-1977, respectively. IEEE 379 requires, in part, "that single failure analyses of Class 1E systems be electrically preconditioned by the failures that

Response to EDG/FSS Interaction Violation

non-Class 1E systems -- which are coupled in some manner to the Class 1E systems -- may cause."

At Hope Creek, under loss of voltage conditions, the single failure of the Class 1E EDG room ventilation circuitry can be preconditioned by the failures that the non-Class 1E Fire Suppression System circuitry may cause. As discussed previously, a valid or invalid trip signal from the Fire Suppression System would trip the Class 1E EDG room ventilation fan through the approved qualified isolation device (3ZZ relay). However, upon a loss of voltage, the recirculation fan trip circuitry drops out and the Class 1E LOP sequencer starts the recirculation fan to support operability of the EDGs. Therefore, under loss of voltage conditions, the EDG room ventilation circuitry single failure can be preconditioned by the failures of the non-Class 1E fire suppression system circuitry and meets the single failure criterion.

Under degraded grid voltage conditions, the single failure of the Class 1E EDG room ventilation circuitry is not preconditioned in that a failure of the non-Class 1E circuitry may cause the EDG room ventilation fans to de-energize. Under specific degraded grid conditions, the EDG would be required to start and load and it is postulated that the recirculation fan could be inhibited from starting.

Apparent Cause

A 10CFR21 notification was issued on November 6, 1984 by the fire damper manufacturer (Ruskin), documenting the potential for fire dampers to inadequately close against normal ventilation system flow. The resolution of this generic issue is discussed in UFSAR section 9.5.1.1.15.1, item 1. The resolution of the Part 21 was a design change implemented in October 1985 (prior to receipt of operating license) to install the 3ZZ relay to trip the EDG room recirculation fan upon Fire Suppression System initiation. This fan trip assures closure of the fire dampers.

Although the design change appropriately considered loss of voltage, sustained undervoltage consistent with EDG design basis requirements was not appropriately considered. The non-Class 1E, non UPS power source supplied to the 3ZZ relay is de-energized upon detection of less than or equal to 90% grid voltage by the non-Class 1E under voltage relays. However, the Technical Specifications require the EDGs to start and load at less than 92% grid voltage. Additional information will be provided in the Licensee Event Report.

D. Corrective Steps That Have Been Taken and Results Achieved

A temporary modification was implemented to disconnect the 3ZZ relay from the non-Class 1E Fire Suppression System circuit.

Fire watches were posted in accordance with the Hope Creek Fire Protection Program to compensate for the degraded fire protection system.

E. Corrective Steps That Will Be Taken to Avoid Further Violations

Specific commitments to avoid further violations will be described in the Licensee Event Report to be issued by February 3, 1997.

F. Date When Full Compliance Will Be Achieved

Partial compliance with Hope Creek's Design and Licensing Bases was achieved when the 3ZZ relay was disconnected from the non-Class 1E Fire Suppression System circuit using a temporary modification. Full compliance will be achieved upon permanent resolution of the circuit interface concern. Various options are under consideration. The options selected, including the implementation dates, will be described in the Licensee Event Report.

EDG Room Ventilation System Class 1E/Fire Suppression System
non-Class 1E Circuit Interaction

